

Attorney Docket No. TI-31620
Application No.: 10/085,753
Customer No.: 23494

REMARKS

Favorable reconsideration of this application in light of the following remarks is respectfully requested. Claims 1-3, 5, 8, and 10-14 are currently pending. Claims 1 and 8 are amended by the present Amendment. Claim 9 is canceled without prejudice or disclaimer of the subject matter therein. And claims 10-14 are newly added.

In the Office Action dated June 18, 2004, claims 1-3, 5, and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pregrant Publication US 2001/0009155 to Matsuno et al. The rejection is traversed for the reasons stated below.

Applicants thank Examiner Kornakov for the courtesy of an interview granted to Applicant's representative, Jonathan Hack, on December 14, 2004. During the interview, Applicant's representative proposed claim amendments, presented arguments, and detailed how the cited reference does not disclose the claims. Examiner Kornakov indicated that he would reconsider the outstanding grounds for rejection upon formal submission of these amendments and remarks. Accordingly, Applicants now submit in this response the amendments and remarks previously presented to the Examiner during the interview.

The Rejection of Claims 1-3, 5, and 8

In the Office Action, claims 1-3, 5, and 8 were rejected under 35 U.S.C. §103 (a) as being unpatentable over Matsuno. Applicants respectfully traverse this rejection.

The Office Action asserts that Matsuno shows the elements recited in independent claim 1. However, claim 1 has been amended to include forming an oxide

Attorney Docket No. TI-31620
Application No.: 10/085,753
Customer No.: 23494

film at least 2.5 Angstroms thick on a surface of a semiconductor wafer while performing a first cleaning process and that the prescribed time in the first cleaning process is in the range of 3 to 20 minutes. Matsuno does not disclose forming an oxide film on a surface of the semiconductor wafer nor does Matsuno disclose performing a first cleaning process in the range of 3 to 20 minutes, as recited in claim 1.

In particular, Matsuno does not disclose forming an oxide film at least 2.5 Angstroms thick while performing the first cleaning process, as recited in claim 1. Indeed, Matsuno teaches away from forming an oxide on the semiconductor wafer stating it is object of Matsuno not to affect the substrate. See Matsuno, paragraph [0011] last four lines. Moreover, one of ordinary skill in the art would not have been motivated to form an oxide film at least 2.5 Angstroms thick because it is an object of Matsuno not to affect the substrate.

Further, in all disclosed examples, Matsuno does not immerse the semiconductor wafer in a cleaning solution from 3 to 20 minutes, as recited in claim 1. Rather, Matsuno sprays water on a semiconductor wafer for at most 30 seconds. See Matsuno Tables 4, 5, 7, 8, and 10. Immersing a semiconductor wafer in ultra-pure water containing ozone for 3 to 20 minutes as recited in claim 1, among other things, forms an oxide film at least 2.5 Angstroms thick on the semiconductor wafer. Forming the oxide film, among other things, aids in the removal of residual particles. This is in contrast to Matsuno's method of spraying ozonated water on a semiconductor wafer for at most 30 seconds and not affecting the substrate at least because Matsuno does not disclose forming an oxide film on the semiconductor surface. Therefore, Matsuno does not

Attorney Docket No. TI-31620
Application No.: 10/085,753
Customer No.: 23494

disclose the elements recited in claim 1. Accordingly, Applicants respectfully submit that claim 1 is in condition for allowance.

Moreover, the Office Action agrees that Matsuno fails to disclose the time range of 3 to 20 minutes of the first cleaning process, as originally recited in claim 8. The Office Action asserts that the time duration of substrate treatment with ozinated water is a result effective parameter because it affects the level of removal of particles and therefore the cleanliness of the substrate surface. However, Matsuno discloses that the result of applying ozone water to a wafer for a given parameter of time is to oxidatively decompose resist pieces adhered to the substrate. See Matsuno, paragraph [0040], lines 1-5. Matsuno does not expose the wafer to ultra-pure water containing ozone to form an oxide layer. As such, any attempt to increase the parameter of time at which Matsuno's wafers were exposed to ozinated water would be done merely to effect the decomposition of residual particles and not to form an oxide film on the wafer. Indeed, Matsuno teaches away from forming an oxide film because this would affect the wafer. Therefore, the effect of modifying the alleged result effective parameter of exposure time in Matsuno would have been done exclusively to affect the decomposition of the residual particles and not to form an oxide film on the wafer. Accordingly, one of ordinary skill in the art would not have been motivated to increase the time at which the wafer is exposed to ozinated water from 30 seconds to between 3 and 20 minutes so as to, among other things, form an oxide film at least 2.5 Angstroms thick.

In addition, claims 2, 3, 5, and 8 depend from claim 1, and thus, are allowable for at least the same reasons that claim 1 is allowable, as well as for their additional

Attorney Docket No. TI-31620
Application No.: 10/085,753
Customer No.: 23494

recitations. Therefore, Applicants respectfully submit that claims 2, 3, 5, and 8 are also allowable over Matsuno.

As claim 10 recites forming an oxide film at least 2.5 Angstroms thick on a surface of a semiconductor wafer during a first cleaning process and wherein the prescribed time in the first cleaning process is in the range of 3 to 20 minutes, Applicants respectfully submit that claim 10 is in condition for allowance.

In addition, claims 11-14 depend from claim 10, and thus, are allowable for at least the same reasons that claim 10 is allowable, as well as for their additional recitations. Therefore, Applicants respectfully submit that claims 11-14 are also allowable over Matsuno.

In view of the foregoing amendments and remarks, Applicants respectfully request the reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to the Texas Instruments Incorporated Deposit Account 20-0668.

Respectfully submitted,

Dated: December 20, 2004

By:


Jonathan A. Hack
Reg. No. 47,623